# Bridging Digital Skills Gap: Perspectives from Higher Education and Employers in Business and Health Sectors

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### Authors' contributions

*This work was carried out in collaboration among all authors. Author OJK proposed the idea, designed the survey, collected the data, presented the results, and discussed them. Author DWO designed the study, wrote the protocol, transcribed the qualitative data and performed the data analysis. Author SOA managed the study analyses and literature searches. The three authors read and approved the final manuscript. All authors read and approved the final manuscript.*

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## Abstract

This study investigates the alignment between digital skills taught in Higher Education Institutions (HEIs) and those demanded by employers in the business management and health and social care sectors in the United Kingdom. Drawing on a qualitative research approach using primary data, the research explores how recent graduates and industry professionals perceive digital competencies

and identifies strategies for more effective integrating of these skills into university curricula. A total of 51 graduates and 7 employers participated in the study, contributing insights through surveys distributed via email, WhatsApp, and Microsoft Teams. The findings reveal a persistent gap between graduates' digital literacy and employers' expectations, particularly in data analysis, specialised software use, and digital communication. While basic proficiency in tools like Microsoft Office is common, both groups emphasised the need for more advanced, practice-oriented digital training. Employers highlighted adaptability and digital fluency as critical yet underdeveloped attributes among recruits. The study concludes that bridging this gap requires a collaborative effort between HEIs and industry, involving curriculum reform, simulation-based learning, and certification in emerging technologies. These findings contribute to ongoing debates about graduate employability and digital readiness, offering practical recommendations for educational policy and curriculum development.

## 1. Introduction

The transition from higher education to employment is increasingly shaped by the digital competencies graduates bring into the workplace. In sectors such as business management and health and social care, employability extends beyond academic qualifications to encompass digital readiness: the ability to apply digital tools critically, confidently, and ethically in professional contexts. Despite broad recognition of the importance of digital skills; including software proficiency, data analysis, and digital communication, evidence suggests that Higher Education Institutions (HEIs) are not consistently equipping students with the capabilities required by contemporary employers (Billett, 2011; World Economic Forum, 2020).

Ongoing digital transformation across industries has intensified demand for a digitally skilled workforce (Goulart et al., 2022; Trenerry et al., 2021). However, a persistent gap remains between graduate digital competencies and employer expectations, particularly in business and health sectors (Santandreu & Aman, 2016; Khanam et al., 2023). Adaptability alone is insufficient without curricula that embed industry-relevant digital experiences (Morgan et al., 2022). This gap threatens productivity, innovation, and service delivery, especially in sectors undergoing rapid technological change. Zhou et al. (2025) highlight that while universities provide foundational knowledge, graduates often lack job-specific competencies such as data analytics, AI literacy, and advanced digital communication. In healthcare, this challenge is further compounded by the complexity of digital health systems and the ethical and secure handling of sensitive data (Loizou et al., 2020). These shortcomings are significant, as graduate employment outcomes remain a key concern for all stakeholders (Mtawa et al., 2021).

Although prior research has examined digital integration within science and technology disciplines (Tondeur et al., 2012) and the pedagogical use of virtual learning environments (Ifenthaler & Yau, 2020; Means et al., 2014), such approaches often overlook the sector-specific digital demands of business and healthcare professions. Jisc (2019) advocates embedding digital capabilities across curricula rather than isolating them within discrete ICT modules; however, implementation remains uneven across HEIs. Consequently, despite expanded digital literacy initiatives, provision often remains fragmented and overly focused on technical skills, neglecting the integrative and critical capabilities required in complex, data-driven workplaces (Ng, 2012).

Employers increasingly seek graduates who can apply digital tools critically within interdisciplinary and practice-based contexts (Deming, 2017). This study argues that sustainable transitions from education to employment cannot rely solely on curriculum reform. Instead, they require a reconfiguration of institutional priorities, pedagogical strategies, and industry partnerships. Embedding digital fluency across curricula, fostering experiential and problem-based learning, and strengthening co-designed industry pathways are essential to ensure relevance and adaptability (Jackson, 2016; European Commission, 2022; Ofori, 2024). Aligning digital skill provision with sector-specific demands in business and healthcare further necessitates closer integration between academic knowledge and professional practice, particularly where ethical, regulatory, and human-centred considerations shape digital adoption (Topol, 2019). Guided by three research questions

addressing required digital skills, curricular embedding, and industry–HEI collaboration, this study contributes to debates on graduate employability and offers practical insights for developing inclusive, future-ready higher education ecosystems.

## 2. Literature Review

### 2.1 Digital Technology, Employability, and the Higher Education–Industry Transition

Digital technology is now central to graduate employability, particularly within business management and health and social care. Digital competencies, encompassing data analysis, software proficiency, and digital communication are widely recognised as essential for navigating contemporary workplaces (Sambrook, 2018; Lee et al. 2020). In business contexts, digital technologies enable strategic decision-making, process integration, and operational efficiency (Al-Debei and Avison, 2010; Porter and Heppelmann, 2014). Within health and social care, digital systems underpin patient care, information governance, and service delivery (Greenhalgh et al., 2017).

Despite this shared reliance on digital technologies, the literature remains fragmented and discipline-specific. Much existing research focuses on digital integration within STEM disciplines or on the pedagogical use of virtual learning environments (Tondeur et al., 2012; Ifenthaler and Yau, 2020; Khanam et al., 2023). Consequently, the sector-specific digital demands of business and health-related professions are comparatively underexplored. Although Jisc (2019; 2022) advocates embedding digital capabilities across curricula rather than treating them as isolated ICT skills, implementation across HEIs remains uneven and often lacks strategic coherence. This disconnect reinforces concerns that graduates are insufficiently prepared for digitally intensive professional environments (Selwyn, 2019).

### 2.2 Sector-Specific Digital Skill Requirements

Recent policy and labour-market evidence highlight the growing importance of transferable digital skills such as data literacy, cybersecurity awareness, and collaborative technology use (OECD, 2021; World Economic Forum, 2023). However, few studies provide comparative or role-sensitive analyses that distinguish digital competencies by sector, professional function, or career stage (OECD, 2023). This gap is particularly problematic given that identical skill labels often represent different practices across professions.

For business graduates, digital competence increasingly involves enterprise systems such as CRM and ERP platforms, digital project management tools, and data analytics for decision-making (Garcia et al., 2022). In contrast, health and social care professionals require proficiency in electronic health records, telemedicine platforms, and secure handling of sensitive patient data (Greenhalgh et al., 2022; Health Education England, 2021). While health-sector literature frequently highlights persistent challenges of non-adoption, workflow disruption, and capability gaps (Greenhalgh et al., 2017), business-sector research often assumes graduates can rapidly adapt to new systems an assumption challenged by employer reports citing high onboarding and retraining costs (OECD, 2023). These findings suggest that the digital skills gap reflects not only individual deficits but also failures in curriculum-to-workplace translation.

### 2.3 Challenges in Embedding Digital Skills within HEIs

Despite increased awareness, HEIs face persistent barriers in embedding digital skills effectively. Rapid technological change, institutional inertia, limited resources, and uneven digital capability among staff and students continue to undermine curriculum alignment (Selwyn, 2019). While embedded approaches are increasingly favoured over stand-alone ICT modules (Jisc, 2022), pedagogical strategies such as project-based learning, simulations, and micro-credentials are rarely evaluated for long-term impact. Laufer and Gorin (2023) identify embedded digital literacies as promising, yet longitudinal evidence of sustained employability outcomes remains limited. Moreover, while health education has adopted digital simulations and case-based technologies more extensively (Ardizzone et al., 2021), comparable innovations in business education remain underdeveloped.

### 2.4 HEI–Industry Collaboration and the Digital Skills Gap

The literature increasingly recognises that addressing digital skills gaps requires stronger HEI–industry collaboration. Co-designed

curricula, employer-led digital challenges, and applied micro-credentials are emerging as effective alignment mechanisms (Andrews and Higson, 2008; Digital Economy Council, 2022; Ofori, 2024). Sector-specific initiatives such as the NHS Digital Academy demonstrate the value of strategic partnerships in supporting digital upskilling (NHS England, 2023). However, existing studies often focus on large, well-resourced institutions, offering limited insight into the structural barriers faced by smaller or non-metropolitan HEIs. There remains a need for frameworks that clarify shared accountability, incentives, and sustainable implementation pathways.

## 2.5 Conceptual Framework: Digital Skills in Graduate Employability

Positioned at this stage of the review, the conceptual framework addresses a key limitation in the literature: the inconsistent and ambiguous use of the term digital skills. To reduce conceptual fragmentation, this study adopts a digital skills taxonomy informed by Jisc's Digital Capabilities framework and DigComp/DigCompEdu. These models conceptualise digital skills as five interrelated domains: (1) information and data literacy, (2) digital communication and collaboration, (3) digital content creation, (4) digital safety and ethics, and (5) digital problem-solving and adaptability (European Commission, 2022; Jisc, 2022). This framework enables systematic comparison between HE provisions and workplace expectations across business and health sectors. Crucially, it centres digital skills as contextual, practice-based capabilities rather than isolated technical competencies, providing an analytical lens through which curriculum design, pedagogical strategies, and industry partnerships can be evaluated.

## 2.6 Synthesis and Research Gap

Overall, the literature reveals persistent misalignment between HE digital skill provision and sector-specific industry demands. While digital capability is widely recognised as critical to employability, existing research remains fragmented, insufficiently comparative, and weakly grounded in role-sensitive frameworks. By integrating sectoral analysis with a coherent conceptual framework, this study addresses a critical gap and advances understanding of how HEIs can support equitable, sustainable, and future-ready transitions from education to employment.

## 2.7 Methodological Approach

This study was conducted in the United Kingdom and adopted a qualitative research design to explore perceptions of digital skills, curriculum relevance, and workplace expectations within business management and health and social care. A qualitative approach was selected to capture the depth, contextual nuance, and meaning that participants attach to digital competence, rather than to quantify the prevalence of skills. Qualitative inquiry is particularly suited to examining how individuals interpret experiences and articulate expectations in rapidly evolving digital environments (Creswell and Poth, 2018; Lichtman, 2023). This approach aligns with the study's aim of understanding how digital skills are framed, valued, and enacted across educational and professional contexts.

## 3. Methods

Data were collected using an online qualitative survey comprising exclusively open-ended questions, administered via Microsoft Forms and Microsoft Teams and distributed through email and WhatsApp. Participants were recruited through colleague referrals and snowball sampling, enabling access to both recent graduates and employers across sectors. The final sample comprised 51 participants, including new graduates and seven employers (5 from health and social care and 2 from business and management). Participants were invited to reflect in their own words on digital skill development, perceived gaps between higher education provision and industry expectations, and the relevance of digital competencies in professional practice. Employers were additionally asked to describe recruitment experiences and expectations of graduates' digital knowledge and literacy. Participant ages ranged from 21 to 35, with an average age of 24, and demographic details are presented in Appendix (See Table A1).

Although surveys are often associated with quantitative research, qualitative surveys are increasingly recognised as an effective method for collecting rich, text-based data from geographically dispersed participants while maintaining interpretive depth (Braun and Clarke, 2021; Bhangu et al., 2023). The use of open-ended questions facilitated participant-led and responsive data generation, allowing salient issues to emerge organically. This was particularly important given the contested and

inconsistently defined nature of "digital skills" across sectors. Compared with interviews, the qualitative survey approach offered greater flexibility for participants with professional constraints while still producing data suitable for rigorous thematic analysis (Braun and Clarke, 2006). Consistent with qualitative research aims, the study prioritised analytical insight and conceptual understanding over statistical generalisability.

## 3.1 Conceptual and Theoretical Framework

Data analysis was guided by the Jisc Digital Capabilities framework and the European Digital Competence frameworks (DigComp and DigCompEdu), which served as analytical lenses rather than measurement tools. These frameworks enabled systematic interpretation of participants' accounts by organising reported skills and gaps across five domains: information and data literacy, digital communication and collaboration, digital content creation, digital safety and ethics, and digital problem-solving and adaptability (European Commission, 2022; Jisc, 2022).

Using these frameworks enhanced analytical rigour by providing a shared conceptual vocabulary through which participants' narratives could be compared across sectors and educational contexts. This approach aligns with qualitative best practice, where theory-informed frameworks are used to structure interpretation while remaining sensitive to emergent themes (Miles et al. 2020; Higgins et al. 2019). Crucially, the frameworks supported examination of curriculum-to-workplace alignment, enabling the study to identify not only perceived skill gaps but also how digital competencies are understood and enacted within professional practice.

## 3.2 Validity and Reliability

In qualitative research, rigour is established through trustworthiness, credibility, and transparency, rather than statistical reliability or validity. The focus is not on verifying objective facts but on understanding the meanings participants attach to their experiences and how these meanings shape professional trajectories (Polkinghorne, 2007; Braun and Clarke, 2021). Accordingly, this study sought to explore how perceived gaps in digital skills within higher education curricula influence graduates' employability and career prospects, rather than

to confirm the factual accuracy of individual accounts. Consistent with Riessman's (2001) narrative perspective, emphasis was placed on how participants interpreted and constructed their experiences of digital preparedness and its impact on career development. Credibility was enhanced through accurate representation of participants' views, with all three authors independently reviewing the findings to ensure interpretive coherence and minimise researcher bias (Lincoln and Guba, 1985; Creswell and Poth, 2018). Transferability was supported by providing thick description of the study context and participant perspectives, enabling readers to assess relevance to other educational or professional settings. Dependability and confirmability were strengthened through the maintenance of a clear audit trail, documenting data collection procedures, analytical decisions, and reflexive considerations throughout the research process (Nowell et al., 2017). Together, these strategies ensured methodological transparency, analytical rigour, and trustworthiness of the findings.

## 4. Results Presentation and Analysis

### 1. What are the Digital Skills Required for Health and Social Care Professionals to Meet Industry Demand?

The data collected from the graduates' survey (see Chart A1), based on the question "What are the digital skills required for health and social care professionals to meet industry demand?", covers areas such as Basic Computing Skills (including the use of Microsoft Word, Excel, and basic computer operations), specific Software Proficiency: knowledge of specialised software for healthcare (e.g., patient management systems), and Data Analysis and Reporting (skills in data collection, analysis, and the use of analytical tools for reporting).

Based on participants' responses, both industries have similar skill requirements for day-to-day activities and to meet industry demand. However, participants' responses were accompanied by interesting and insightful comments that revealed strengths in some areas and weaknesses in others (Bates and Sangrà, 2019). For example, regarding the use of basic computer skills in their profession, 27% of health and social care graduates emphasised the importance of basic computing skills and specialised software in healthcare settings. In comparison, 73% of

business management graduates stressed the importance of digital skills across all industries (See Chat A2). These findings suggest that digital skills are considered essential, particularly in software used for patient management and data reporting in healthcare and social care. This result further highlights the crucial role of digital skills, rather than merely their desirability, across all industries.

Our study reveals that digital skills are considered essential, with a particular emphasis on software used for patient management and data reporting.

These skills are now necessary across industries and are no longer optional. This highlights the need for basic digital proficiency. Participant responses indicate that both sectors have similar skill requirements for their daily activities. Participants provided engaging and insightful comments, highlighting their strengths and weaknesses in digital competence. The study demonstrates that digital skills are vital, particularly in software used for patient management and data reporting in employment contexts. For instance,

Participant P19 said, "*I think we should learn more and more about new technology."*

Another participant (P25) also stated, "*Computer technology will help us keep confidential information about our service users and support them better."*

Additionally, participant P12, *a nurse aspiring to a leadership role, said: "Using software and technology helps with therapeutic engagement among patients, their families, and other health professionals for effective care delivery."*

These comments underscore the importance of incorporating software proficiency into our curriculum to better prepare students for the job market.

"*IT will help us better report cases across departments and professionals and track work progress," stated participant P13* regarding data analysis and reporting (See Table A2).

The findings align with those of Lee et al. (2020) and Sambrook (2018), which underscore the role of digital technology in facilitating a successful transition for graduates into industry as they develop digital skills. However, student responses also reveal specific challenges. According to RAND (2021), the study examined key issues surrounding the digital skills gap and found that technological progress demands ongoing digital skills development across all levels of education.

This report emphasises the need to adapt higher education curricula to meet the rapidly changing needs of the digital workplace. Nonetheless, concerns about students' readiness, resource availability, and the availability of trained staff, as noted in the Jisc (2023) findings, may pose challenges. To develop a role-sensitive skills taxonomy that informs curriculum development and policy more effectively, higher education institutions need to continuously collaborate with relevant industries to understand the specific digital skills required for students to transition smoothly into employment after graduation.

## 2. What digital Skills are Required for Business Management Studies to Meet the Industry Demand?

Like graduates from health and social care, graduates from business and management surveys also revealed the following commonly required skills. Microsoft Office Suite Proficiency: Excel for data analysis, Word for documentation, and PowerPoint for presentations. For example, *a participant (P1) said, "It would be good to have these and digital skills in lessons."*

*Participants (P2, P3) stated: "Microsoft skills and the use of various software."*

*Participants (P4, P5) also mentioned that accounting software and other Microsoft Office literacy software were among the job requirements for the positions they applied for.*

Regarding Data Analysis Tools: Familiarity with Power BI, R, and other data analytics software tools. There were conflicting responses; most did not respond, and others provided information without explanation. For example,

*Participant (P6) said, "Data analysis tools and email marketing techniques were required, but I did not have them."*

Also, another business and management graduate who specialises in Marketing stated that

*"Specific software for marketing"* was required for the role applied to by the participant (P9*).*

*Participant P23,* *a business management graduate, stated that knowledge of accounting software was part of the requirements for the role she applied for* (See Table A2).

Responses from business and management graduates were like those from health and social care graduates. This suggests that digital skills are essential for graduate employment and should be embedded across all higher education modules. For example, Communication and IT Skills: General IT skills, digital communication tools, and collaborative platforms should be used in classes to support students' learning and mastery. Other accounting software, such as Sage 50, QuickBooks, and Xero, should be embedded in accounting and finance modules to support students' digital skills development and prepare them for employment upon graduation. For health and social care, virtual simulations and case-based digital practice should be embedded to enable real-time skill application (Ardizzone et al., 2021).

This approach should be applied to other business and management programmes, as well as healthcare programmes, to better prepare students for the specific digital skills required for employment.

There were no differences between business and healthcare management graduates. See participants' comments (P1, P3, P6) and those of participants (P16, P17, P19, P49 and P50). The survey results also revealed that 73% of respondents from business and management schools indicated a need to acquire digital skills. 86% of participants recognised the need to embed digital skills in their lessons when asked whether digital skills were critical in their careers (See Chart A3). Notably, the data highlights the significant demand for digital skills in the current global labour market. Business management roles often require a strong foundation in Microsoft Office applications, particularly Excel. There is also high demand for data analysis skills and software tools for business process optimisation. This study explicitly investigates how embedded digital pedagogy translates into professional readiness and ongoing skill use after graduation. This will support the sustainability and scalability of embedded strategies across disciplines, with a particular

interest in how these approaches foster continuous learning cultures that align with rapidly changing digital demands.

## 3. Employers' Response to Digital Skills Requirement

Seven employers participated in the survey: five from the Health and Social Care sector and two from the Business Management sector. Three of the seven employers are limited liability companies, while the remaining four are partnerships (See Table A3). Three employers recruit new graduates annually, another three recruit seasonally, and one does not recruit graduates. All the employers are based in England, in the Greater London area, and most have employed new graduates across various business departments. The employers answered different survey questions, with their responses indicating a preference for graduates with field experience before starting their roles. Additionally, both employers sought new graduates who could adapt quickly, demonstrate a commitment to their work, communicate effectively in writing and orally, and display some IT skills. However, when asked whether they required essential digital skills during the interview, two employers in business and management answered 'yes', while five in health and social care answered 'no'.

Regarding the challenges they faced in recruiting new graduates, all seven employers highlighted issues such as punctuality, trustworthiness, knowledge gaps, and the efficient use of digital skills, suggesting that new graduates may be less punctual and less trustworthy. Again, when asked "Does your organisation provide training for skills development for new graduates?", all 7 employers responded "yes" and provided training on using office laptops and mobile phone apps to record service users' information and perform data entry. The same response was given to the question, "Are there mentoring opportunities to develop digital skills for new graduates?" The employers were also asked about the "type of digital skills they consider important when interviewing a new graduate". In response, they mentioned computer literacy, knowledge of computer systems, "software and hardware, the use of Microsoft Office, and data management".

All the employers used words such as "essential" and "very essential" to answer the survey question *", How do you consider the need for digital skills after the pandemic experience?"* This was not surprising, as the pandemic changed job

requirements and skill needs across sectors worldwide. Regarding the question "Do you think new graduates are well equipped with the basic digital skills required for employment after graduation?" Employers offered diverse views. For example, two responded *"not really" and "yes."* The rest explained their responses: *"No, we need to constantly provide training, as they were not properly trained for the work environment." "Somehow, but we still have to train and mentor them."* These were employers from the Health and Social Care Sector. Other examples include: "*Most graduates are well equipped with the basic digital skills" and "There are gaps that need to be filled about digital skills and communication in management"* Three employers responded to the question:

*Do you have any other comments on digital and other skills requirements for graduate employment?* "*We expect graduates to come to employment prepared, but we don't get that". We still must invest time and money to bring them to the expected level.* "Most companies require digital skills as part of the interview process", and "Training and retraining for upselling is key to personal and corporate business development and management". However, the other four employers responded "NO" and "NOT REALLY". Suggesting a conflicting response between employers (See Table A4).

## 4. Discussion

### 5.1 Digital Skills Required for Business Management and Health and Social Care Professionals

This study confirms that digital skills are no longer supplementary but integral to professional competence across both business management and health and social care sectors. Consistent with Billett (2011), the findings demonstrate that employability increasingly depends on how effectively digital skills are integrated into authentic professional contexts rather than taught as isolated technical abilities. Participants across both sectors identified foundational competencies—such as Microsoft Office proficiency, digital communication platforms, data entry systems, and electronic records—as essential baseline requirements. In health and social care, these findings align with Greenhalgh et al. (2017; 2022), who emphasise that digital technologies are embedded within service delivery, patient engagement, and governance structures. Similarly, business-sector participants

highlighted the growing importance of Excel-based analytics, CRM systems, Power BI, and digital marketing tools, reflecting the transformation of competitive practices through smart and connected technologies (Porter and Heppelmann, 2014; Garcia et al., 2022).

Despite recognising these requirements, graduates' readiness to apply industry-standard digital tools varied considerably. This reinforces concerns raised by Morgan et al. (2022) and OECD (2023) that HEIs often prioritise general digital literacy while underexposing students to applied, role-specific digital systems. The findings therefore support the argument that digital skill gaps are not simply individual deficits but structural misalignments between curricula and workplace expectations.

### 5.2 Similarities and Differences in Sectoral Digital Skill Requirements

While both sectors demand digital competence, the nature and depth of application differ significantly. Health and social care professionals prioritise data accuracy, confidentiality, electronic health records, and regulatory compliance, reflecting ethical and governance requirements inherent to care environments (Health Education England, 2021; Greenhalgh et al., 2017). In contrast, business management roles emphasise financial software, customer relationship management systems, and digital communication for strategic decision-making and operational efficiency (Sambrook, 2018; Porter and Heppelmann, 2014). These distinctions support calls for sector-sensitive digital skill frameworks, as identical skill labels often mask fundamentally different practices (OECD, 2023). Nonetheless, both sectors share a reliance on digital tools to enhance productivity, accountability, and stakeholder communication, reinforcing digital literacy as a cross-cutting employability requirement.

### 5.3 Embedding Digital Skills in HE Curricula for Sustainable Learning

Participants strongly advocated for embedding digital skills across curricula, rather than delivering them through stand-alone modules. This aligns with Jisc's (2019; 2022) position that digital capabilities should be woven into learning, teaching, and assessment practices. The findings further support Kukafka et al. (2011) and Rodrigues (2017), who argue that effective digital transformation requires institutional leadership,

investment, and cultural change. Simulation-based learning, frequent formative assessment, and exposure to real-world digital tools were identified as critical for building confidence and adaptability; particularly considering accelerated digitalisation during and after the COVID-19 pandemic. These results reinforce Selwyn's (2019) assertion that digital preparedness is now a prerequisite for both graduate employability and institutional relevance.

### 5.4 HEI–Industry Collaboration to Bridge the Digital Skills Gap

A central theme emerging from the data was the need for closer HEI–industry collaboration. Employers and graduates alike called for curricula aligned more closely with workplace realities, echoing Adams and Handford's (2019) advocacy for co-created learning, work-integrated modules, and employer engagement in curriculum design. Consistent with RAND (2021) and Andrews and Higson (2023), the findings highlight those sustained partnerships—such as internships, co-designed assessments, and embedded certifications—are essential for keeping education responsive to labour market change. This shared responsibility model positions digital skill development as a collaborative ecosystem rather than an institutional burden.

## 6. Conclusion

This study demonstrates that digital skills are essential determinants of graduate employability across business management and health and social care. While foundational digital competence is widespread, significant gaps persist in graduates' preparedness for applied, sector-specific digital tasks. The findings reinforce the urgent need for HEIs to embed digital skills systematically within curricula and to collaborate more closely with industry partners. In an era defined by hybrid work, digital healthcare, and data-driven business models, addressing the digital skills gap is not only an employability concern but a matter of economic sustainability, service quality, and social wellbeing. Bridging this gap therefore represents a shared commitment to innovation, productivity, and inclusive workforce development in a digitally transformed society.

## 7. Recommendations

(i) This study calls for a sustained framework of collaboration between HEIs and industry, offering continuous learning pathways and setting clear digital competency benchmarks.

(ii) Partnerships between HEIs and industries to co-develop modules that prepare graduates to be not only job-ready but also resilient and adaptable to future technological changes.

(iii) Creating internship programmes and practical training to help students gain real-world experience in applying digital skills acquired through their studies. This will help students build the confidence needed for job interviews and exams. It will also improve their academic writing by allowing them to incorporate real-world experiences into their academic work.

## 8. Practical Implications

For employers, collaborative curriculum design and student involvement in work-integrated learning, such as internships, co-operative education, and placement opportunities, were seen as vital strategies. These approaches enable students to experience the demands of the workplace firsthand while also equipping them with the digital language and competencies expected in their professions. The study further highlights the institutional challenges faced by HEIs, including limited resources, rapid technological change, and the need for cultural and leadership shifts. Digital transformation must be embraced not as an isolated IT function but as a strategic, cross-institutional priority. Leaders within HEIs must model digital behaviours, invest in infrastructure, and upskill both teaching and administrative staff.

## Appendix

Appendix available in this link: https://drive.google.com/file/d/1hf-q_t5FYNamtOf6OWztAUGg7D2HBwNi/

## Consent

In accordance with international and university standards, the authors have obtained and retained written permission from the participants.

## Disclaimer (Artificial Intelligence)

The authors declare that no generative AI technologies, such as large language models

(e.g., ChatGPT, COPILOT) and text-to-image generators, were used during the writing of this manuscript.

## Competing Interests

Authors have declared that no competing interests exist.

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